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Douglas-fir Tussock Moth Monitoring in Southern Idaho, 1987

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ABSTRACT

Based on the results of the 1987 early warning survey, Douglas-fir tussock moth populations appear to be declining in southern Idaho. Defoliation is not anticipated at the 20 trapping sites in 1988.

INTRODUCTION

Population outbreaks of the Douglas-fir tussock moth, *Orgyia pseudotsugata* (McD.), occur cyclicly throughout the interior forests of the west (Brookes et al. 1979). During an outbreak, populations increase rapidly then peak and decline within a 3 to 4 year period. Defoliation of Douglas-fir, grand fir, and to a lesser extent subalpine fir can be severe. Larvae preferentially feed on new foliage but will consume older foliage under heavy population pressures. Severe defoliation can cause growth reduction, top-kill, and tree mortality.

An early detection survey, utilizing sampling methods designed to detect rapid population increases 1 to 2 years prior to an outbreak, has been used operationally in southern Idaho since 1981. This report documents the results of the 1987 early detection survey.

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METHODS

The early detection survey in use throughout southern Idaho includes pheromone-baited trapping schemes to detect male moths and lower-crown beating procedures to detect low or suboutbreak larval populations. Fairly complete data sets from 1982 to 1986 exist for 20 previously sampled sites for 1987. At each sampling site 5 pheromone-baited traps were deployed following the procedures outlined by Daterman et al. 1979. Additionally, based upon the results and recommendations made by R. Thier 1987, pheromone-baited trapping was intensified at 7 sites where the 1986 per trap catch exceeded 25 moths. The rationale supporting the selection of this 25 moth threshold has been explained by Thier 1987. Intensified trapping was initiated at 5 sites on the Payette National Forest, the Little Water Gulch site on the Sawtooth National Forest, and the Dewey Peak site on Bureau of Land Management lands in the Owyhee Mountains. At these sites 2 additional sets of 5 traps each were deployed in stands located within 1 mile of the original site. Data collected at each site included the number of male moths captured within each trap.

Larval sampling using sequential sampling procedures, developed by R. Mason 1978, was conducted at 2 sites, the Little Water Gulch site and the Olive Creek site, where the 1986 per trap catch exceeded 30 moths. The cumulative number of small larvae recovered at each site was recorded.

An additional monitoring method being developed cooperatively by FPM Region 5 and the University of California to sample the population seeking pupation sites was evaluated at each of the 20 original sampling sites. This method involves selecting 10 host trees within the trapping site and nailing 2 pupation shelters to opposite sides of the bole of each tree. Each pupation shelter was constructed according to the design developed by Region 5 and University of California (Wenz, personnel communications). Data collected included the total number of pupae per shelter and the sex distribution of these pupae.

Table 1 lists the locations of the original 20 sampling sites and the sampling method used at each site.

RESULTS AND DISCUSSION

The average number of male moths per trap recovered in 1987 indicated that populations generally declined throughout southern Idaho. Trap catches decreased at 13 of the original 20 sites and remained relatively static at the other 7 sites. Trap catches exceeded the 25 moth threshold at 2 of the original sites, the Little Water Gulch and Dewey Peak sites, for the second consecutive year. Table 2 compares the annual trap catches for all sites monitored since 1980.

Table 3 summarizes trap catch information at sites where the two additional sets of traps were deployed in 1987. Trap catches for all sets of traps on the Payette National Forest except the one at Fourbit Creek were well below the 1986 level and the 25 moth threshold. Therefore intensified trapping is not recommended at any of the sites on the Payette National Forest in 1988.

Table 1. Location and sampling methods utilized during the 1987 Douglas-fir tussock moth early warning survey in southern Idaho.

Plot	Location			Larval Samples Date	Pupation Shelters		Pheromone traps		
	Twp.	Rge.	Sec.		Instal.	Retrv.	#	Instal.	Retrv.
<u>Boise N.F.</u>									
Bear Creek	4N	10E	7	N.S.	6/25	10/19	5	7/13	10/19
Skunk Creek	12N	4E	14	N.S.	6/25	10/22	5	7/07	10/22
<u>Payette N.F.</u>									
Adams Creek	14N	6W	23	N.S.	6/09	10/21	5	7/09	10/21
Barinaga Corral	20N	2W	23	N.S.	6/10	10/21	5	7/08	10/21
Bear Saddle	15N	5W	31	N.S.	6/09	10/21	5	7/09	10/21
E. Fk. Brownlee Creek	16N	4W	3	N.S.	6/11	10/21	15	7/09	10/21
Fourbit Creek	13N	2E	7	N.S.	6/25	10/20	15	7/08	10/20
McDowell Trail	17N	2W	17	N.S.	5/27	10/21	15	7/08	10/21
Olive Creek	17N	2W	7	5/27	5/27	10/20	15	7/08	10/20
Seid Creek	16N	4W	21	N.S.	6/11	10/21	15	7/09	10/21
Stacy Creek	14N	6W	14	N.S.	6/09	10/21	5	7/09	10/21
<u>Salmon N.F.</u>									
Colson Creek	23N	16E	12	N.S.	6/16	11/04	5	7/14	11/04
Lick Creek	26N	22E	32	N.S.	6/17	11/03	5	7/14	11/03
<u>Sawtooth N.F.</u>									
Little Water Gulch	3N	12E	7	5/29	5/29	10/19	15	7/13	10/19
Virginia Gulch	3N	11E	9	N.S.	6/25	10/19	5	7/13	10/19
<u>Idaho State Lands</u>									
Sharps Canyon	2N	19E	36	N.S.	6/18	10/18	5	7/09	10/18
<u>B.L.M. Lands</u>									
Dewey Peak	6S	4W	3	N.S.	6/03	10/21	15	7/07	10/21
Mill Creek	8S	5W	12	N.S.	6/04	10/20	5	7/07	10/20
New York Summit	4S	3W	32	N.S.	6/03	10/19	5	7/06	10/19
So. Fk. Boulder Creek	8S	5W	24	N.S.	6/04	10/20	5	7/07	10/20

N.S. = Not sampled

Table 2. Summary of male Douglas-fir tussock moths caught in pheromone-baited sticky traps distributed in southern Idaho - 1980 - 1987.

Plot	Location			Mean Number of Male Douglas-fir Tussock Moths/Trap by Year							
	Twp.	Rge.	Sec.	1980	1981	1982	1983	1984	1985	1986	1987
<u>Boise N.F.</u>											
Anderson Creek Divide	14N	2E	14	N.S. ¹	1.2	0	11.0	N.S.	N.S.	N.S.	N.S.
Bear Creek	4N	10E	7	N.S.	N.S.	0	32.8	0.4	0	1.2	1.4
Skunk Creek	12N	4E	14	N.S.	0.2	0.6	29.0	0	1.0	1.2	0.2
Yellow Pine Creek	3N	10E	35	N.S.	N.S.	0	10.6	0.4	N.S.	N.S.	N.S.
<u>Payette N.F.</u>											
Adams Creek	14N	6W	23	N.S.	N.S.	53.6	39.6	7.8	4.0	17.6	8.8
Barinaga Corral	20N	2W	23	N.S.	N.S.	N.S.	44.2	0.4	2.8	4.0	2.0
Bear Saddle	15N	5W	31	N.S.	N.S.	15.2	44.0	1.0	0.2	0.2	0.4
Brown's Pond	18N	4E	3	N.S.	0	0.6	11.0	0.5	N.S.	N.S.	N.S.
E. Fk. Brownlee Creek	16N	4W	3	N.S.	N.S.	61.2	50.6	2.6	3.4	27.0	6.0
Fourbit Creek	13N	2E	7	N.S.	N.S.	49.8	42.8	N.S.	4.8	30.4	2.0
Little Weiser	13N	1E	1	N.S.	N.S.	N.S.	25.6	N.S.	0.6	0.4	N.S.
McDowell Trail	17N	2W	17	N.S.	N.S.	N.S.	35.8	5.0	6.8	24.6	1.2
Olive Creek	17N	2W	7	N.S.	N.S.	36.8	51.2	14.6	10.5	46.8	9.8
Seid Creek	16N	4W	21	N.S.	N.S.	N.S.	17.4	11.2	N.S.	27.2	4.8
Stacy Creek	14N	6W	14	N.S.	N.S.	N.S.	42.8	18.0	8.8	3.8	5.0
<u>Salmon N.F.</u>											
Arnett Creek	22N	20E	30	N.S.	N.S.	0	0.6	0	N.S.	N.S.	N.S.
Colson Creek	23N	16E	12	N.S.	N.S.	15.2	39.0	3.2	N.S.	7.2	5.2
Headwaters	20N	20E	9	N.S.	N.S.	N.S.	N.S.	0	N.S.	N.S.	N.S.
Lick Creek	26N	22E	32	N.S.	N.S.	7.6	38.4	0.6	N.S.	6.0	0.6
Porphyry Creek	20N	18E	34	N.S.	N.S.	0	4.6	0	N.S.	N.S.	N.S.
<u>Sawtooth N.F.</u>											
Couch Summit	2N	14E	9	N.S.	0.4	0	7.0	0	N.S.	N.S.	N.S.
Howell Canyon	12S	25E	31	N.S.	N.S.	N.S.	N.S.	0.2	N.S.	N.S.	N.S.
Little Water Gulch	3N	12E	7	N.S.	3.8	13.6	27.0	17.2	0	34.6	26.6
Virginia Gulch	3N	11E	9	N.S.	0.6	2.0	26.8	1.8	0	4.8	6.8
Warm Springs	4N	17E	14	N.S.	N.S.	2.6	14.8	0.8	N.S.	N.S.	N.S.
<u>Idaho State Lands</u>											
Sharps Canyon	2N	19E	36	N.S.	19.4	16.2	41.2	1.3	5.2	22.6	8.4
<u>B.L.M. Lands</u>											
Dewey Peak	6S	4W	3	55.0	64.0	N.S.	N.S.	15.0	1.6	33.7	38.6
Mill Creek	8S	5W	12	0.6	47.6	N.S.	N.S.	6.6	0	0.4	0.0
New York Summit	4S	3W	32	N.S.	N.S.	N.S.	N.S.	0	N.S.	1.8	3.8
So. Fk. Boulder Creek	8S	5W	24	N.S.	N.S.	N.S.	N.S.	0.7	0.2	1.8	0.2

¹ N.S. - not sampled

Table 3. Mean number of male Douglas-fir tussock moths recovered in pheromone at the intensified trapping sites in southern Idaho, 1987.

Plot	Mean No. Moths/Trap		
	Original Site	Extra Set	Extra Set
<u>Payette N.F.</u>			
E. Fk. Brownlee	6.0	12.0	0.8
Fourbit Creek	2.0	2.3	37.0
McDowell Trail	1.2	3.2	2.3
Olive Creek	9.8	12.6	1.8
Seid Creek	4.8	2.6	6.8
<u>Sawtooth N.F.</u>			
Little Water Gulch	26.6	3.5	16.4
<u>B.L.M. Lands</u>			
Dewey Peak	38.6	2.4	1.8

At the 2 other sites where trapping was intensified in 1987, trap catches exceeded the 25 moth threshold at the original trap sites but they were below this level for all additional sets of traps. Intensified trapping at these sites should be continued in 1988.

Defoliation caused by the Douglas-fir tussock moth is not anticipated during 1988 at any sites where trap catches exceeded the 25 moth threshold. On the Payette National Forest, historical records from 1981 to 1986 indicate that defoliation has not been detected even when catches averaged 50 moths per trap; and during the 1982 to 1983 outbreak in the Owyhee Mountains, defoliation was detected only following trap catches averaging 50 to 55 moths (Thier 1987). Defoliation was detected in 1973 in Little Water Gulch on the Sawtooth National Forest (Tunnock et al. 1985). During that outbreak pheromone traps were not utilized and therefore thresholds associated with defoliation do not exist for that area. Since the 1987 trap catches were considerably lower than the 1986 catches and defoliation was not detected in 1987, defoliation is not anticipated in 1988.

Low larval populations were detected at Little Water Gulch and Olive Creek. At the Little Water Gulch site 2 larvae were recovered on 12 trees, while at the Olive Creek site no larvae were recovered on 6 trees.

Preliminary results of pupal sampling via pupation shelters suggest that there may be a positive correlation between pupal case numbers and moth trap catches (Table 4). The utility of this method to predict suboutbreak populations will require several more years of data collection and evaluation.

Table 4. Numbers of pupal cases by sex recovered in the 20 pupation shelters located at each sampling site in southern Idaho, 1987.

Plots	Mean Pheromone Catch	Total No. Pupal Cases	
		Females	Males
<u>Boise N.F.</u>			
Bear Creek	1.4	0	0
Skunk Creek	0.2	0	0
<u>Payette N.F.</u>			
Adams Creek	8.8	0	0
Barinaga Corral	2.0	0	0
Bear Saddle	0.4	0	0
E. Fk. Brownlee	6.0	0	1
Fourbit Creek	2.0	1	0
McDowell Trail	1.2	0	0
Olive Creek	9.8	0	0
Seid Creek	4.8	0	0
Stacy Creek	5.0	0	0
<u>Salmon N.F.</u>			
Colson Creek	5.2	1	0
Lick Creek	0.6	0	0
<u>Sawtooth N.F.</u>			
Little Water Gulch	26.6	1	3
Virginia Gulch	6.8	1	1
<u>Idaho State Lands</u>			
Sharps Canyon	8.4	1	0
<u>B.L.M. Lands</u>			
Dewey Peak	38.6	1	4
Mill Creek	0.0	0	0
New York Summit	3.8	0	0
So. Fk. Boulder Creek	0.2	0	0

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